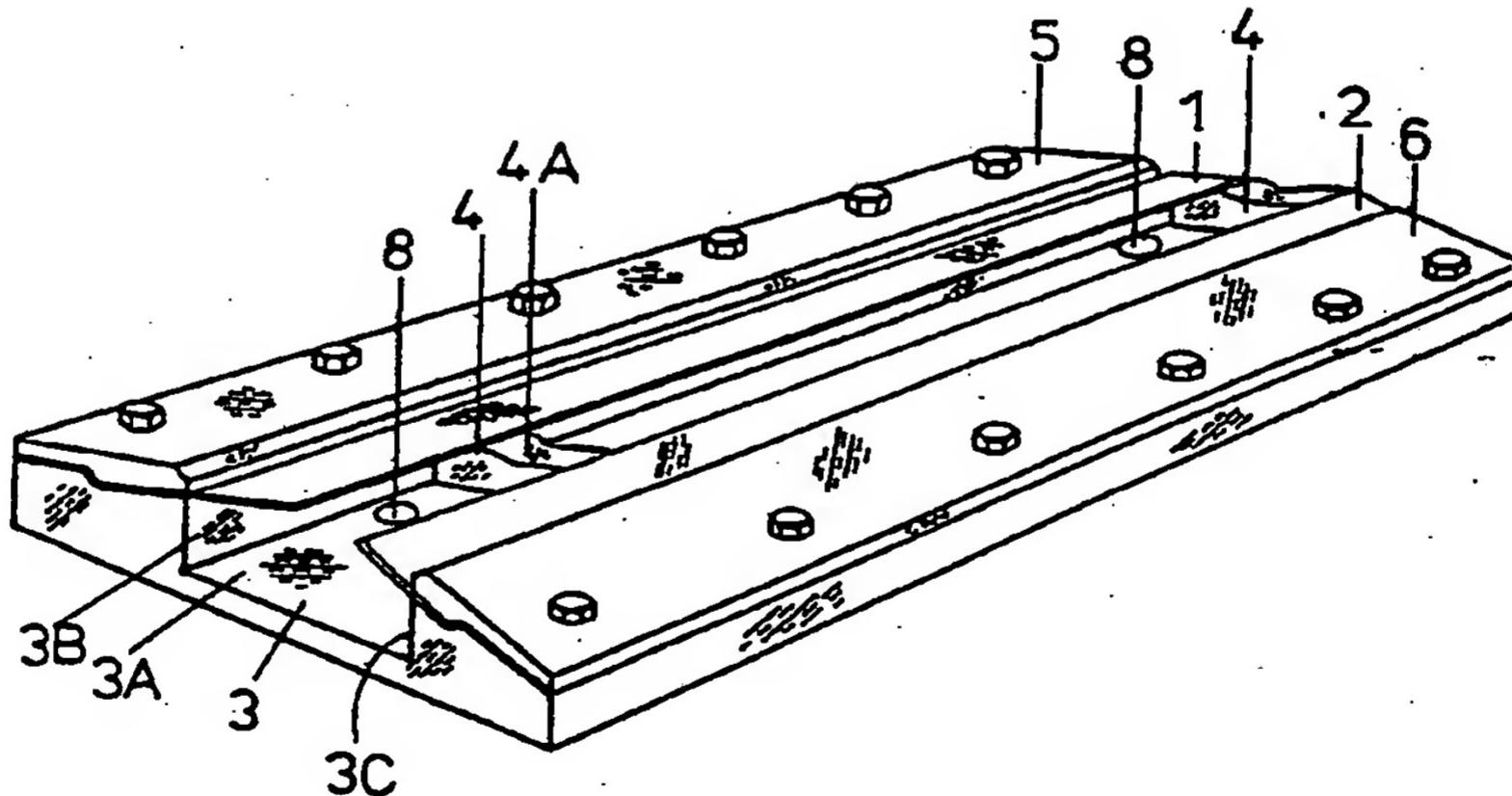




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## (54) Title: DOCTOR BLADE CHAMBER DEVICE



## (57) Abstract

A doctor blade, in particular a chambered doctor blade, comprising at least one doctor blade for abutting against a printing means, in particular a printing or colour printing roller or other printing means, to be coated with a fluid material, and with a behind the doctor blade or the doctor blades arranged chamber, which preferably through the doctor blade or the doctor blades abuts against the printing means, is described. For the improving of such a doctor blade, such as achieving a simplified and beamtight sealing, at least one partitioning means (4), crosswise oriented, is arranged in the chamber (3) so that this partitioning means (4) tightening abuts against the inside of the chamber (3) and against the under side of the doctor blades (1, 2), and in that the partitioning means (4) at the spacing between the edges of the doctor blades (1, 2) exhibits a concave shape able to abut against the outside of the printing means. The partitioning means may in a more detailed described manner comprise one or more tightening or sealing means and may be displaceable arranged.

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Doctor Blade Chamber Device

The present invention relates to a doctor blade, in particular a chambered doctor blade, comprising at least one doctor blade for abutting against a printing means, in particular a printing or colour printing roller or other printing means, to be coated with a fluid material, and with a behind the doctor blade or the doctor blades arranged chamber, which preferably through the doctor blade or the doctor blades abuts against the printing means.

Such doctor blades are widely used for coating printing means, such as printing or colour printing rollers, with a film or coating of printing ink.

Generally, such doctor blade chambers are closed at the ends by means of terminating plates which most often abut against the end portions of such a roller, i.e. with a terminating plate at each end of the printing means. On the other hand, this widely used solution has the disadvantage that the terminating end portions of the chamber are not sufficiently tight which makes itself shown in that printing ink leaks out from the chamber at the terminating plates of the end portions, and often in the way that the leaking results in emission of one or more thin beams of printing ink from the chamber due to the fluid pressure within the chamber. Naturally, such leaking is inconvenient. Another drawback is present when changing the printing means to another, with another length, in that the doctor blade or doctor blades then have to be changed also.

With the purpose to enable a driving of the printing means as well in one as in the opposite direction such doctor blades generally are composed of two doctor blades which by means of suitable holding means are sitting on the longitudinal edges of a lengthy, in cross section

U-shaped chamber having its longitudinal edges located at the outer ends of this U-shaped cross section, and whereby the edges of the doctor blades, suitably spaced, are arranged facing each other and being oriented pointing 5 some what up against each other in such a way that they, each laying against a cylindric shaped printing means, are arranged as tangentially or more obliquely positioned in relation to the surface of the printing means.

A want is present for improving the doctor blade 10 embodiments of the previous art, and in particular of the kind mentioned in the ingress, so that the mentioned drawbacks are avoided.

This is achieved through the invention by arranging, crosswise oriented, a partitioning means in the chamber so 15 that this partitioning means tightly abuts against the inside of the chamber and against the under side of the doctor blades, and in that the partitioning means at the spacing between the edges of the doctor blades exhibits a concave shape able to abut tightly against the outside of 20 the printing means.

Such partitioning means may be easy to put in place and to remove. This is in particular the case when these means are manufactured of an elastomeric material.

Such partitioning means present further advantages 25 besides the avoiding of the mentioned drawbacks.

By means of the partitioning means according to the invention being arranged at the ends of the chamber, in practice an effectively functioning tight connection between the printing means and the internal portion of the 30 chamber is provided. The partitioning means may thus be located anywhere in relation to the longitudinal axis of the chamber, i.e. at a location along the axis which is oriented in parallel with for instance the axis of rotation of a cylindric shaped printing means. Thus, the length 35 of the chamber may be rather arbitrarily chosen, and more

such partitioning means may be put in place enabling the printing simultaneously of more printing ink colours, preferably within areas to be striped, with one and the same printing means, or alternatively, by way of saving printing ink, a printing in striped areas may be provided. In such a case, a further possibility, also if for instance two or more side by side arranged articles simultaneously have to be printed by means of the same printing means, is to put in place two or more chambered doctor blades according to the invention, and these chambered doctor blades being positioned with adjustable mutual spacings which may be selectively arranged.

As the partitioning means as such are comparatively cheap to manufacture, a considerable amount of chambers for the doctor blades, as compared to the amount hereof else required for the solving of a lot tasks, may be saved. The chambers may easily after use be cleaned, in that one or more cleansing fluids are brought to flow through the chambers before their removal. Thus, the use of a given doctor blade together with more kinds of printing inks, etc., does not present any problem, a quick use oppositely being possible.

An improving of the partitioning means may be provided by the letting in of a sealing thread or cord into the concave surface of the partitioning means turned against the printing means to abut against this means. The ends of such a sealing thread or cord may for instance below the range of the doctor blades be kept in place by being curved or loopwise let into the partitioning means, whereby a displacing or falling out of the sealing thread or cord is avoided. Instead, the sealing thread or cord could take the shape of a list. Alternatively, more than one sealing means could be put in place in each partitioning means. It is often an advantage that the material of the sealing is more hard and wear-resisting than the other ma-

terials of the partitioning means, herethrough increasing the useful lifetime of the partitioning means. On the other hand, these means are themselves so cheap, and changing takes so often place, that throwing-away of the partitioning means at the time of such events in practice economically seen is unimportant.

Due to better sealing, and also due to the better use of the width of operation of the printing means, and also in respect to adaptation to more kinds of articles to be printed, and also in respect to reduced consumption of printing ink, the partitioning means presents an improvement, and also better environmental behaviour is achieved, in part through less consumption of printing ink, and in part through the reduction of the amount of different chambered doctor blade means required for the carrying out of different practical printing tasks.

Embodiments according to the invention are described in more details in the following with reference to the drawing, in which:

- 20 Fig. 1 in the perspective shows an embodiment of a chambered doctor blade according to the invention,  
fig. 2 illustrates a partitioning means 4 to be used at embodiments as according to that of fig. 1,  
25 fig. 3 in the perspective shows another embodiment of a partitioning means as according to fig. 2, and  
fig. 4 in the perspective shows a pair of printing rollers as viewed obliquely towards one end hereof including an embodiment of arranging a chambered doctor blade as according to Fig 1 together with the pair of printing rollers.

30 Fig 1 of the drawing illustrates a chambered doctor blade comprising a U-shaped doctor blade chamber 3 arranged behind two doctor blades 1 and 2 which are positioned

pointing obliquely upward and inward protruding over the chamber 3 as from the top of side surfaces 3B and 3C of the chamber 3, and whereby the bottom surface of the chamber is formed by the surface 3A. Through openings or studs 5 8 printing ink is led into and out from the chamber 3.

Thus, the doctorblades 1 and 2 are laying against the upper surfaces of the side walls 3B and 3C of the chamber 3. By means of, for each of for instance, a row of screws the doctor blades 1 and 2, tightly spanned, are kept in place against the side walls 3B and 3C. The upper surface of these walls may for instance be staircaselike shaped to provide a safe holding of the doctor blades.

Longitudinally the chamber 3 is subdivided by means of partitioning means 4 to comprise one larger or more 15 smaller chambers 3, in Fig 1 two such partitioning means 4 are shown.

The partitioning means 4 are shown in more details in Fig 2 and comprise a concave surface 4A determined to abut against a for instance cylindric printing roller, as 20 delineated the edges of two doctor blades 1 and 2 being positioned pointing towards each other, in parallel with the axis of the printing roller, abutting against the circumference of the printing roller. The surfaces 4B and 4C are laying against the under side of the doctor blades 1 25 and 2. The partitioning means 4 are for instance manufactured consisting of an elastomeric material exhibiting a suitable elasticity together with wear-resistance against the frictional abutting against printing rollers, which rollers in well known manner comprise an uneven surface. 30 In case a more long-lived and wear-resisting embodiment of the partitioning means 4 is wanted for instance a cordlike means 7 may be let into the surfaces 4A, 4B and 4C as shown in Fig 3 of the drawing. To achieve sealing against the under side of the doctor blades the cordlike and for 35 instance metallic means 7 may be let into the surfaces 4B

and 4C at a depth which increases with the distance from a spot located just close to the edges of the doctor blades and in direction towards the narrow outer ends of the partitioning means. By means of suitable knot- or 5 bottom-shaped ends of the cordlike metallic means 7 this means, by means of correspondingly shaped openings or fixation means arranged in the partitioning means 4, may be kept in place in these means 4 preventing casual pulling out therefrom. Such kind of fixation is for instance deli- 10 neated by means of the inward pointing dotted lines being drawn at both ends of the partitioning means shown in Fig 4. With four wire or cord means being run from the parti- tioning means according to Fig 3 and to which means they are fixed it is possible to pull partitioning means in 15 place within a doctor blade chamber. Such thread or cord means may, maintaining suitable sealing, easily be guided past corresponding embodiments of neighbouring parti- tioning means 4.

In Fig 4 of the drawing two cylindric printing 20 rollers 9 and 10 are shown at which a chambered doctor blade abuts against the printing roller 9. The chambered doctor blade comprises two doctor blades 1 and 2 being kept in place by two holding plates 5 and 6 each to lay against a side wall belonging to a U-shaped chamber 3. 25 Through openings or studs 8, of which one is shown, printing ink is led into and out from the chamber 3 via a hose 14. The chambered doctor blade is mounted unto a not shown holding means which for instance comprises bottom-shaped pins to engage into slots in a holding plate 30 11 positioned at the external side of the chamber 3. On the same side a further holding means 12 is located comprising a screw handle means 13 for the fixation of the chambered doctor blade.

The four wire or cord means shown in Fig 3 may com- 35 prise suitable marks so that partitioning means 4 from

outside easily may be brought to be rightly positioned within the chamber 3.

Two further embodiments of a partitioning means according to the invention are shown in the drawing in Figs 5 5, 6 and 7. In Fig 8 the chambered doctor blade according to Fig 1 is shown together with a holding spring for the holding of partitioning means within the doctor blade chamber. The spring is to better understanding shown drawn out from the doctor blade chamber.

10 The embodiment, which in the perspective is shown in Fig 5 of a partitioning means 4, is shaped with inclined oriented narrow side surfaces, i.e. such as 4A, 4B and 4C. The partitioning means may as shown in Fig 6 which shows the partitioning means as viewed from the opposite side 15 be hollow shaped so that its cross section is U-shaped. As shown in Fig 7 which shows the same as Fig 6 but with a slightly different embodiment the cross sectional shape instead of U-shaped may be E-shapewise. Inside the narrow side portions 4A, 4B, 4C, 4D, 4E, 4F an internally protruding portion 4G is present, and this portion may be massive. This results for the purpose with a strengthening 20 of the partitioning means, i.e. functions to an improved functioning as specified.

In Fig 8 of the drawing a spring clamp is shown 25 which sideways may be slid into the doctor blade chamber to abut against the partitioning means 4. When the spring clamp has to be taken out or has to be displaced in particular a suitable pair of tongs may be used which comprises pointed portions able to grip into openings 4K and 30 4L in the spring clamp and to press the spring ends of the branch portions 4I and 4J towards each other. Herethrough, the spring pressure against the inside of the doctor blade chamber, in particular against the side surfaces 3B and 3C, is reduced or removed so that a displacing of the 35 spring clamp easily may be carried out. This spring clamp, when having a suitable width, exhibits the advantage that

the spring connecting portions between the branches 4I and 4J and to the lengthy portion 4H in case of possibly augmented pressure from a partitioning means towards the spring produce a twisting of these connecting portions 5 so that their from the partitioning means remotest spring edge fixating is pressed against the side surfaces 3B and 3C of the doctor blade chamber whereby a displacing is made more difficult.

## C L A I M S

1. A doctor blade, in particular a chambered doctor blade, comprising at least one doctor blade for abutting against a printing means, in particular a printing or 5 colour printing roller (9) or other printing means, to be coated with a fluid material, and with a behind the doctor blade or the doctor blades arranged chamber (3), which preferably through the doctor blade or the doctor blades abuts against the printing means, characterized 10 in that at least one partitioning means (4), crosswise oriented, is arranged in the chamber (3) so that this partitioning means (4) tightly abuts against the inside of the chamber (3) and against the under side of the doctor blades (1, 2), and in that the partitioning 15 means (4) at the spacing between the edges of the doctor blades (1, 2) exhibits a concave shape able to abut tightly against the outside of the printing means (9).

2. A doctor blade according to claim 1 characterized in that the partitioning means (4) is made of elastomeric material.

3. A doctor blade according to claim 1 or 2 characterized in that at least a piece of sealing thread or sealing cord (7) is let into or another sealing means is arranged in the concave 25 surface of the partitioning means (4) turned against the printing means (9) to abut against this means (9).

4. A doctor blade according to claim 3 characterized in that the ends of the sealing thread or sealing cord (7), preferably under the 30 range of the doctor blades (1, 2), is kept in place by being curved or loopwise let into the partitioning means (4).

5. A doctor blade according to claim 3 or 4 characterized in that the sealing

thread or sealing cord (7) has the shape of a list.

6. A doctor blade according to claim 1, 2, 3, 4 or 5 characterized in that the material of the sealing is more hard and wear-resisting than the 5 other materials of the partitioning means (4).

7. A doctor blade according to claim 1, 2, 3, 4, 5 or 6 characterized in that the cross section of the partitioning means (4) exhibits at least one in one direction open hollowness, such as a U-10 shaped or E-shaped hollowness.

8. A doctor blade according to claim 1, 2, 3, 4, 5, 6 or 7 characterized in that the partitioning means (4) has side surfaces, such as abutting side surfaces (4A, 4B, 4C), shaped as inclined oriented 15 narrow side surfaces.

9. A doctor blade according to claim 1, 2, 3, 4, 5, 6, 7 or 8 characterized in that a sealing maintaining, within the doctor blade chamber (3) displaceable spring belongs to the partitioning means (4).

20 10. A doctor blade according to claim 9 characterized in that the spring is shaped as a totally or in part closed ring of ribbon shaped or ribbon shapewise spring material (4H, 4I, 4J, 4K, 4L, 4M) or through spring means or elements.

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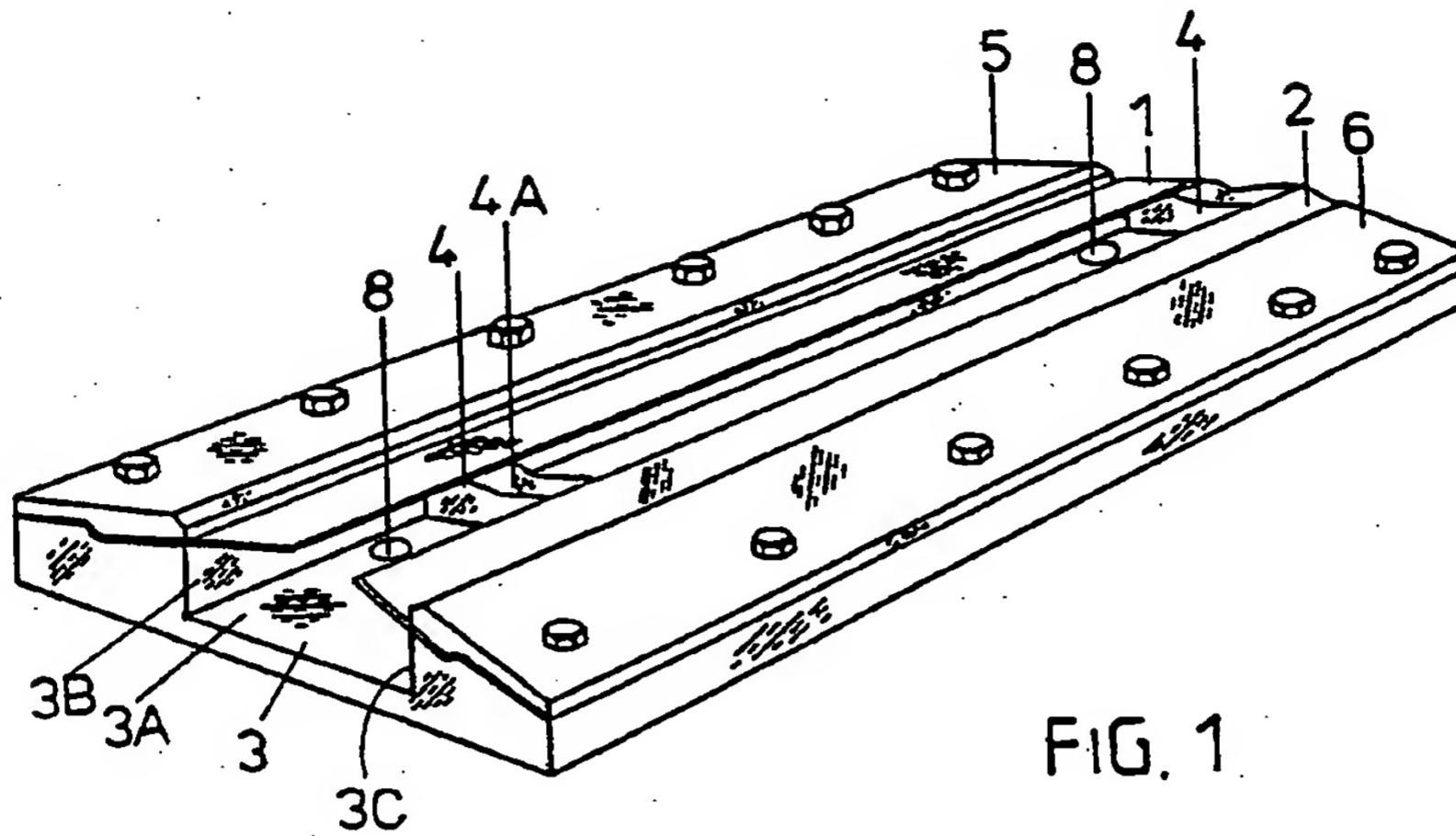


FIG. 1

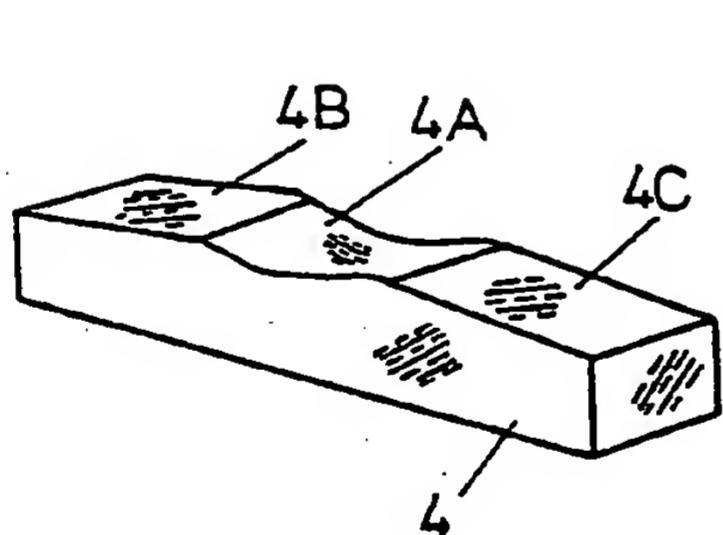


FIG. 2

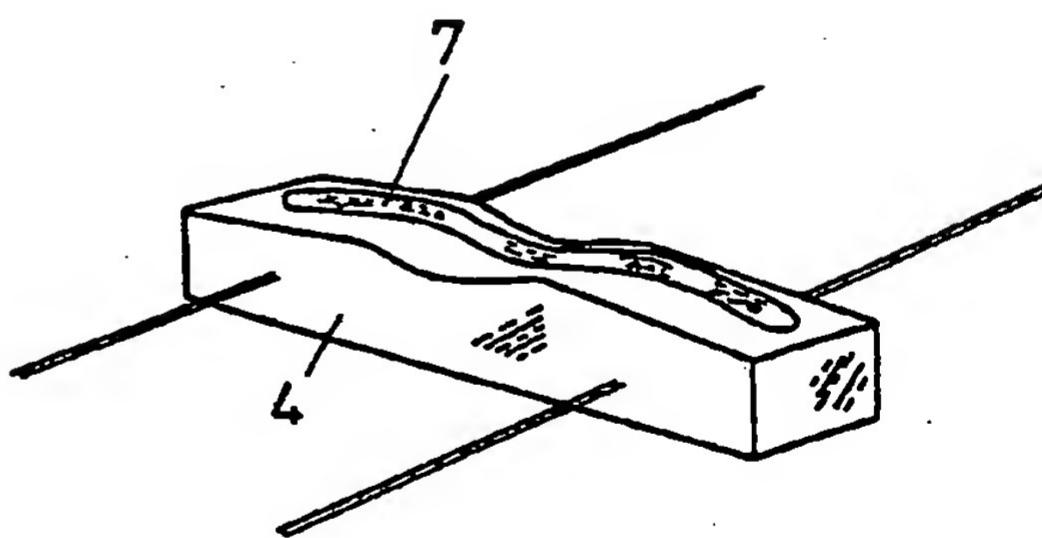


FIG. 3

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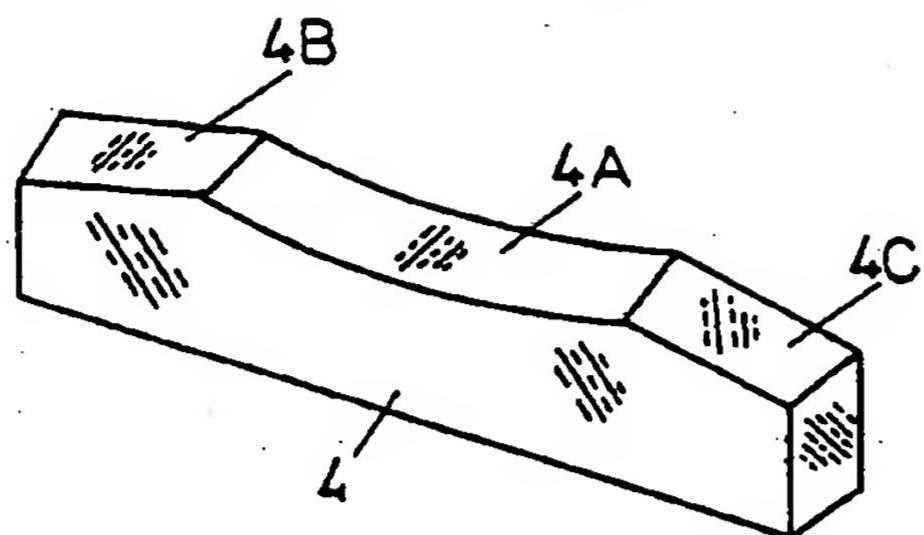


FIG. 5.

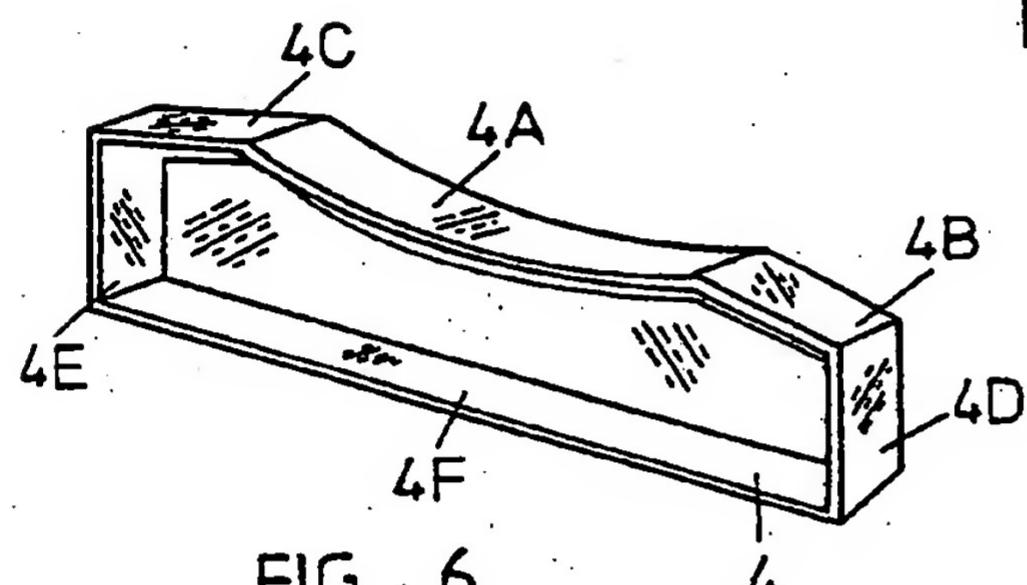


FIG. 6

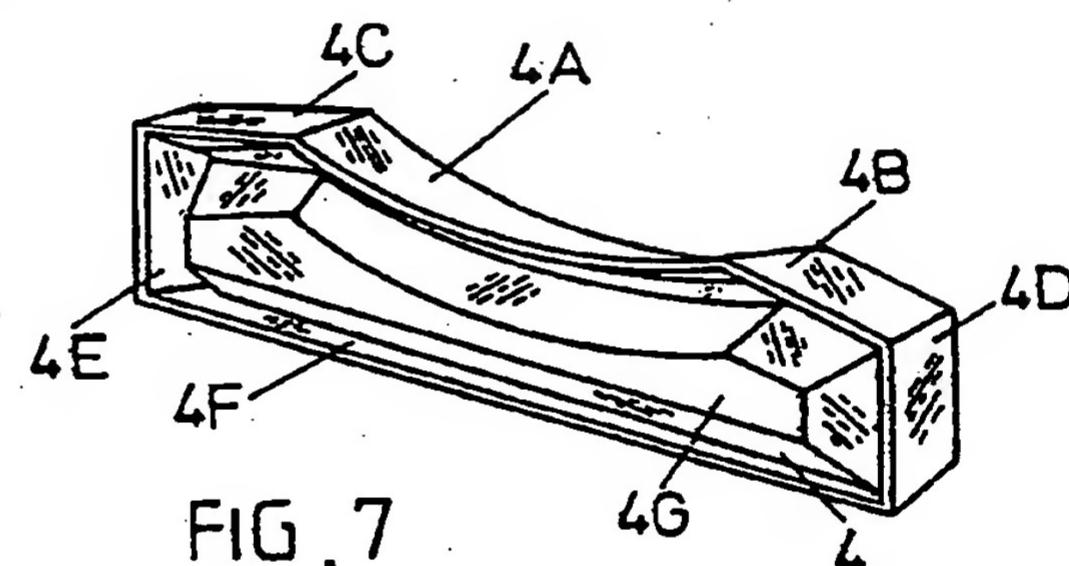


FIG. 7

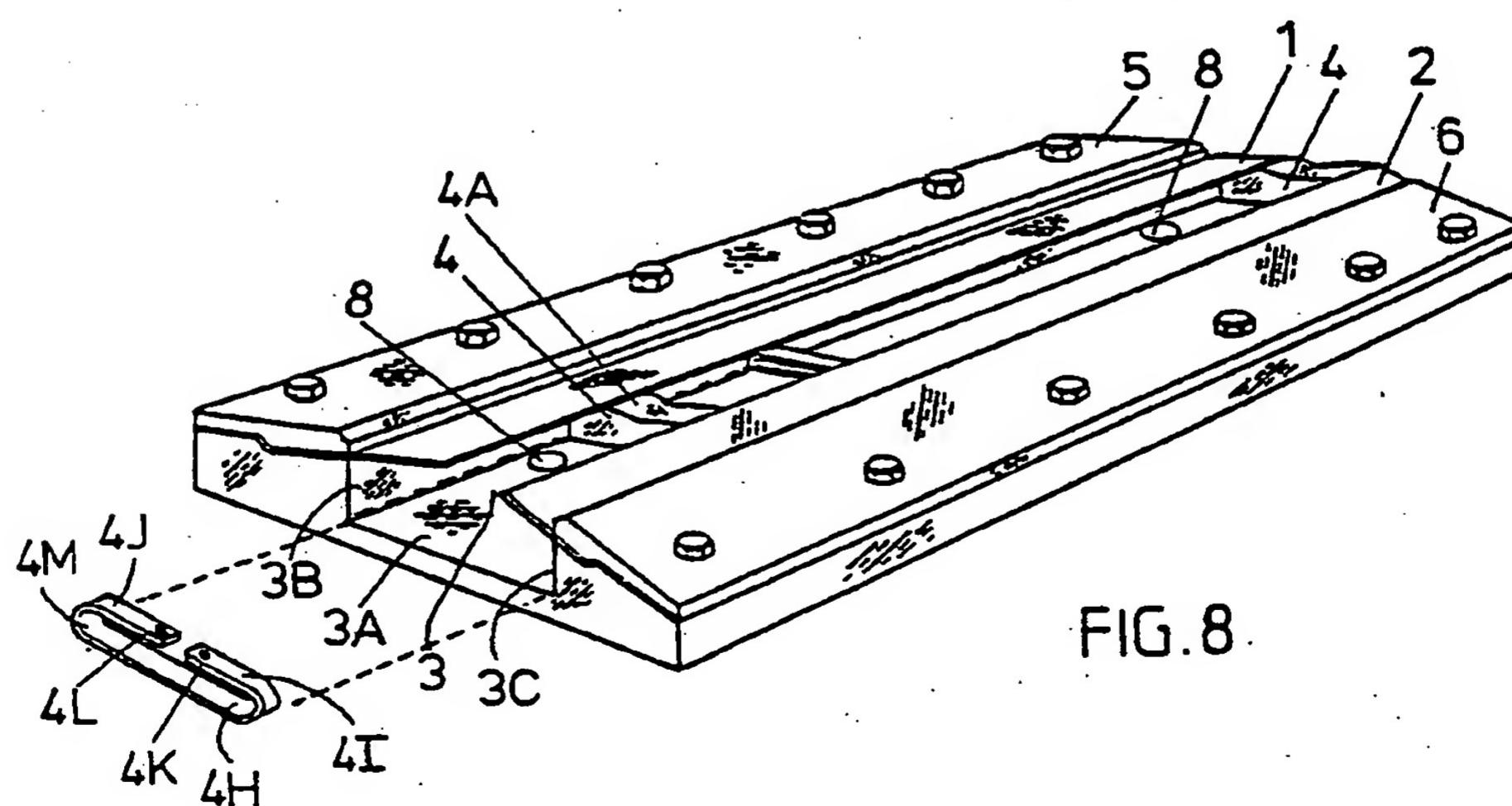


FIG. 8.

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